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ABSTRACT

In 1990, President Bush and the nation's governors adopted the six National Education Goals as part of a campaign to increase educational performance at all levels. Goal 3 states that, by the year 2000, American students will leave grades 4, 8, and 12 having demonstrated competence in challenging subject matter, including English, mathematics, science, history, and geography, and that every school in America will ensure that all students are prepared for responsible citizenship, further learning, and productive employment in the modern economy. This report examines the achievement of 17-year-olds and 9-year-olds in mathematics, reading, and science, and recommends some steps parents and schools can take to improve performance. Data are from the National Assessment of Educational Progress report from 1991 ("Trends in Academic Progress"). The results are not encouraging. Not only are many of the 17-year-olds failing to acquire the skills they need, but the 9-year-olds are not performing better than their counterparts in the past. A decline in reading and an increase in television watching accompany these trends. Parents can help by encouraging children to read, helping them use their free time more constructively than watching television, and working with the schools. Schools can improve performance by assigning regular homework, by holding all students to the same high standards, and by having high expectations for all students. Three graphs are included. (SLD)

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Research Report

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Meeting Goal 3: How Well Are We Doing?

In 1990, the President and the nation's Governors adopted six National Education Goals as part of a decade-long campaign to increase educational performance at all levels. Goal 3—the Student Achievement and Citizenship goal—states that:

"By the year 2000, American students will leave grades four, eight, and twelve having demonstrated competency in challenging subject matter including English, mathematics, science, history, and geography; and every school in America will ensure that all students learn to use their minds well, so they may be prepared for responsible citizenship, further learning, and productive employment in our modern economy."

How far do we need to go to meet this goal? Are today's 17-year-olds prepared for responsible citizenship, further education, and the workplace? And, if they are not well enough prepared, what can be done to ensure that tomorrow's students are better prepared?

This research report examines the achievement of today's 17-year-olds and 9-year-olds in math, reading, and science and recommends some steps that parents and schools can take to improve that performance.

The data in this report are from the National Assessment of Educational Progress (NAEP) report *Trends in Academic Progress* (November, 1991). It provides information on student achievement patterns across time at ages 9, 13, and 17 in math, reading, and science, and the results are not encouraging. Not only

are many of the nation's 17-year-olds failing to acquire the skills they need, but today's 9-year-olds, who will leave high school at the turn of the century, are not performing better than 9-year-olds in the past.

Today's 17-Year-Olds

As measured by the NAEP data, the nation's 17-year-olds do not appear to be well prepared for today's workforce or further education:

- **Mathematics:** Only half (56 percent) of 17-year-olds can compute with decimals, fractions, and percents; recognize geometric figures; solve simple equations; and use moderately complex mathematical reasoning.
- **Reading:** Less than half (41 percent) can find, understand, summarize, and explain relatively complicated information in a text.
- **Science:** Less than half (43 percent) have some detailed scientific knowledge and are able to evaluate the appropriateness of scientific procedures.

Only a few students can do higher level work in these subjects:

- **Mathematics:** Only 7 percent can solve problems that involve fractions and percents, solve two-step problems involving variables, identify equivalent algebraic expressions, and solve linear equations and inequalities.

- **Reading:** Only 7 percent can synthesize and learn from a variety of specialized reading materials.
- **Science:** Only 9 percent can infer relationships and draw conclusions using detailed scientific knowledge.

Tomorrow's 17-Year-Olds

It is clear from these results that students are not leaving high school with the skills they need. But what about younger children? If they are doing better now than in the past, we might have reason to believe that they will leave high school knowing more than today's 17-year-olds. Unfortunately, today's 9-year-olds appear to be doing only somewhat better in math and science than 9-year-olds in the past, and no better in reading:

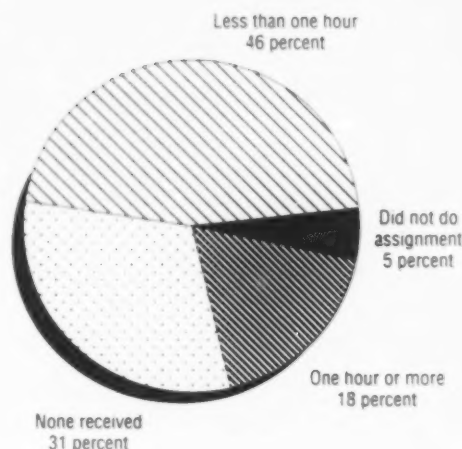
- **Mathematics:** 28 percent of the 9-year-olds in 1990 could add, subtract, multiply, and divide using whole numbers, and could solve one-step problems, compared to 20 percent in 1978.
- **Reading:** 18 percent could search for specific information, interrelate ideas, and make generalizations, about the same percentage as in 1971.
- **Science:** 31 percent could understand and apply general information from the life and physical sciences, compared to 26 percent in 1977.

The improvement in math and science is certainly encouraging, but the achievement is far from reaching world class standards. Furthermore, a substantial proportion of 9-year-olds were functioning at a very low level:

- **Mathematics:** Nearly one out of every five (18 percent) 9-year-olds in 1990 could not add and subtract two-digit numbers or recognize relationships among coins.
- **Reading:** One out of every ten (10 percent) could not carry out simple, discrete reading tasks.
- **Science:** One out of every four (24 percent) were unable to understand simple scientific principles.

One must be careful about diagnosing causes of students' poor performance from survey data. Most surveys collect limited information on school programs and out-of-school activities, and observed relationships are not necessarily causal. The information we do have, however, is not encouraging.

Figure 1.— Amount of homework completed each day by 9-year-olds



NAEP 1990

Today's 9-year-olds are not engaging more in activities which might lead to higher achievement. Three activities are particularly representative.

Homework. Research has shown that student achievement rises significantly when teachers regularly assign homework and students conscientiously do it. If students were doing more homework than in the past, we might expect to see improved achievement in the future. However:

- In 1990, 31 percent of 9-year-olds reported that they did not receive daily homework assignments, about the same percentage (36 percent) as in 1984.
- 5 percent of students reported that they did not do the homework assigned to them.

Reading. Students who read a lot tend to be better readers than those who do not. While there is obviously a certain amount of self-selection here—students who find reading easy are more likely to read more than those who find reading difficult—it is also true that in reading, as in most things, practice tends to improve performance. Unfortunately, children do not appear to be reading more than in the past:

- Only 34 percent of 9-year-old students reported reading books, magazines, or newspapers at least weekly, a drop from 42 percent in 1984.
- Only half (54 percent) of all 9-year-olds reported that they "read for fun" on their own time every day, about the same percentage as in 1984.

Some families, of course, do not have the money to purchase reading materials for their children. But the availability of reading material in the home is significantly limited both in families with the means to purchase materials and in those who could rely on their public library:

- Only 29 percent of 9-year-olds reported that they had four or more types of reading materials (newspapers, magazines, books, and encyclopedias) at home, compared to 39 percent in 1971.
- 36 percent of the students reported that they had only fewer than three of these kinds of materials.

Figure 2.— Mathematics scores, by amount of time spent watching TV each day

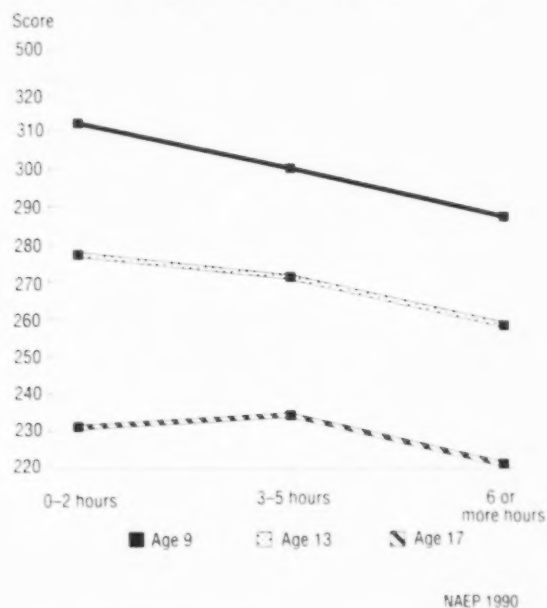
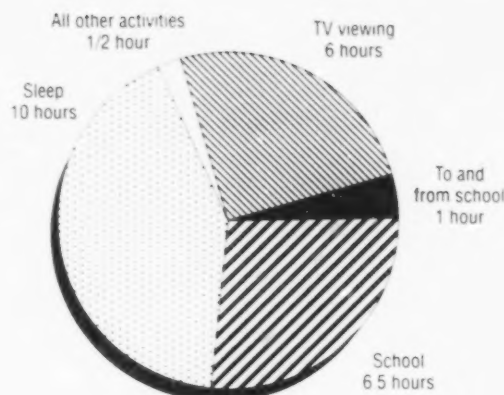


Figure 3.— A typical day for a child who watches TV for 6 hours a day



Television. Excessive television viewing is associated with low academic achievement. In the NAEP math assessment, for example, students who watched a great deal of television had lower achievement scores than those who did not.

And, many children appear to be watching a great deal of TV:

- In 1990, 62 percent of 9-year-olds reported watching TV for 3 or more hours a day, up from 55 percent in 1982.
- 23 percent were watching TV for 6 or more hours every day.

If a child is in school for 6-1/2 hours a day, spends 1 hour per day getting to and from school, sleeps for 10 hours a night, and watches TV for 6 hours, there is only 1/2 hour left for everything else: breakfast and dinner with the family, sports, play, homework, reading. No wonder many children aren't spending much time on homework and reading.

Recommendations

If the Nation is to meet its education goals for the year 2000, parents, children, and schools will need to work together to improve student performance. As the analyses show, there is no single solution to improving student achievement. Many different experiences contribute to a student's success or failure, but both parents and schools can help improve the chances for success.

Parents can demand tougher standards and ensure that school is their children's top priority. At the same time, schools can expect more of their students, and provide opportunities for greater student achievement. Without commitment and hard work on the part of parents, students, and teachers, the goals will not be met.

References:

U.S. Department of Education. *What Works: Research About Teaching and Learning*. Second Edition. Washington, D.C.: 1987.

U.S. Department of Education. *Trends in Academic Progress*, Report No. 21-T-01. Washington, D.C.: November 1991.

Note: The data in this report are from the National Assessment of Educational Progress (NAEP) trend report titled *Trends in Academic Progress*. It is based on six science assessments between 1969-70 and 1990, five mathematics assessments from 1973 to 1990, and six reading assessments from 1971 to 1990. Survey methodology and sample sizes are available in *Trends in Academic Progress* cited above.

Parents can help their children by:

- Encouraging them to read by providing a variety of reading materials, and by setting a good example by reading themselves or by enrolling in adult literacy classes.
- Helping them use their free time in more constructive ways, including monitoring their television viewing.
- Working with the schools to ensure that all children are receiving a challenging education.

Schools can improve performance by:

- Assigning meaningful homework on a regular basis and holding children accountable for completing it.
- Holding all students to the same high standards.
- Having high expectations for all students.

This *Research Report* is the first in a new series published by the Office of Educational Research and Improvement for teachers and parents. If you would like to suggest topics for future *Research Reports*, please write to: Office of Research, U.S. Department of Education, 555 New Jersey Avenue NW, Room 610e, Washington, DC, 20208-5648. To be added to the *Research Report* mailing list, send your name and address to *Research Reports*, Outreach Office, at the address listed above. This report is a public document and may be reproduced in part or in its entirety without permission. Please credit OERI.

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